
VIRGINIA GIS REFERENCE BOOK

General Application Name: Tax/Finance - Parcel Mapping

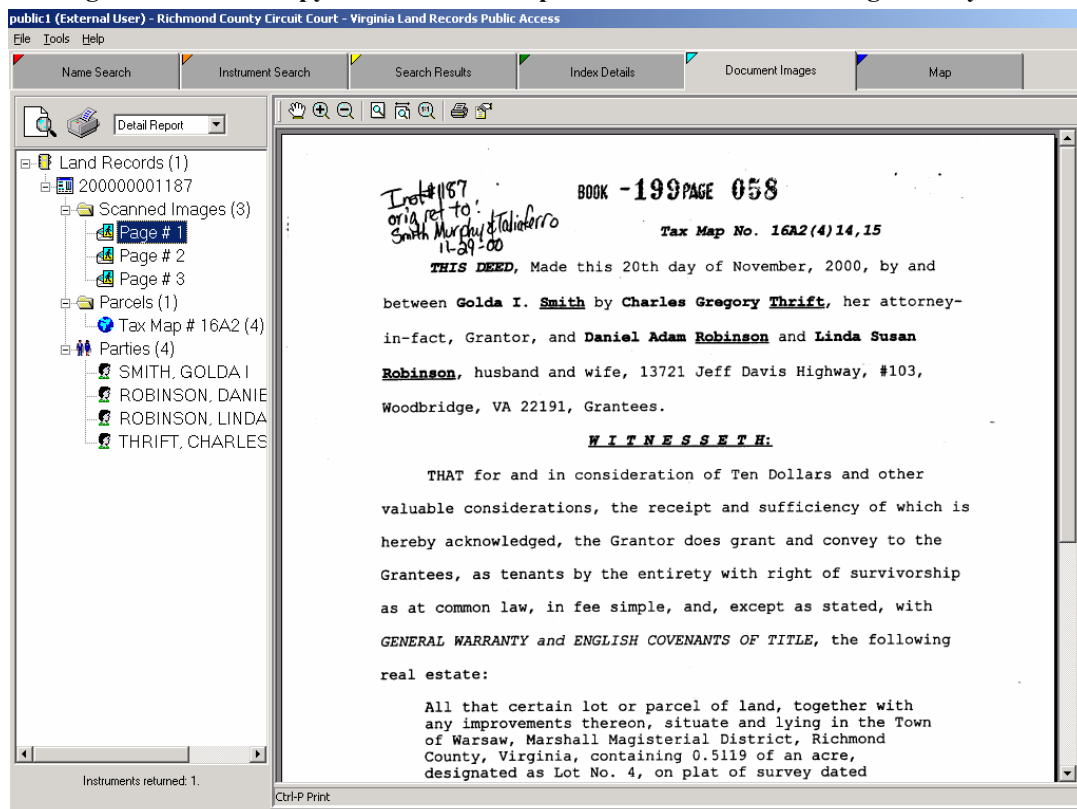
Product / Service / Function Name: Land Records Management

P/S/F Description:

Definition of Land Records Management

The Virginia Land Records Management Task Force defined land records management for Virginia and the many benefits of modernizing the recording and dissemination processes in their Final Report dated January 1, 1998 (http://www.dtp.state.va.us/LRMtf/docs/lrmtf_final_report.pdf). The Task Force has defined land records management as “the uniform indexing and preservation of the instruments and data relating to land integrated with local and state geographic information systems (GIS) layered data, assessment information, and other public records relating to the land and made available to the public.” This broad definition encompasses all land records (e.g. deeds, plats, wills, judgments) including ownership rights and interests, land record instruments recorded in the Clerks' offices, and all other information related to the land that is contained in public records.

Figure 1. Scanned copy of a deed in a computerized land records management system



Land information is a vital asset that supports many governmental and non-governmental activities. Much of the land data collected and maintained by local governments are generated from land parcel transactions, building permits, zoning and subdivision reviews, voter registration, police and fire protection and locality taxation functions. In fact, the parcel (or tax) maps are defined by the deeds, plats and other documents recorded in the Circuit Court Clerk's Offices of Virginia. For this reason, GIS for local governments begins in the Clerk's Office because changes in parcel geometry and attribution are recorded there. Therefore, the link between land record documents and GIS is critical to the overall flow of land information to other departments in city and county governments.

Land records management is a requirement for each locality in Virginia, and the Circuit Court Clerk has a legal obligation to maintain the land records for that locality. Clerks collect significant revenue (taxes & fees) for the State and locality during document recordation, and the operations of many businesses and other city and county departments depend on the accurate and timely distribution of information from the Clerk's office.

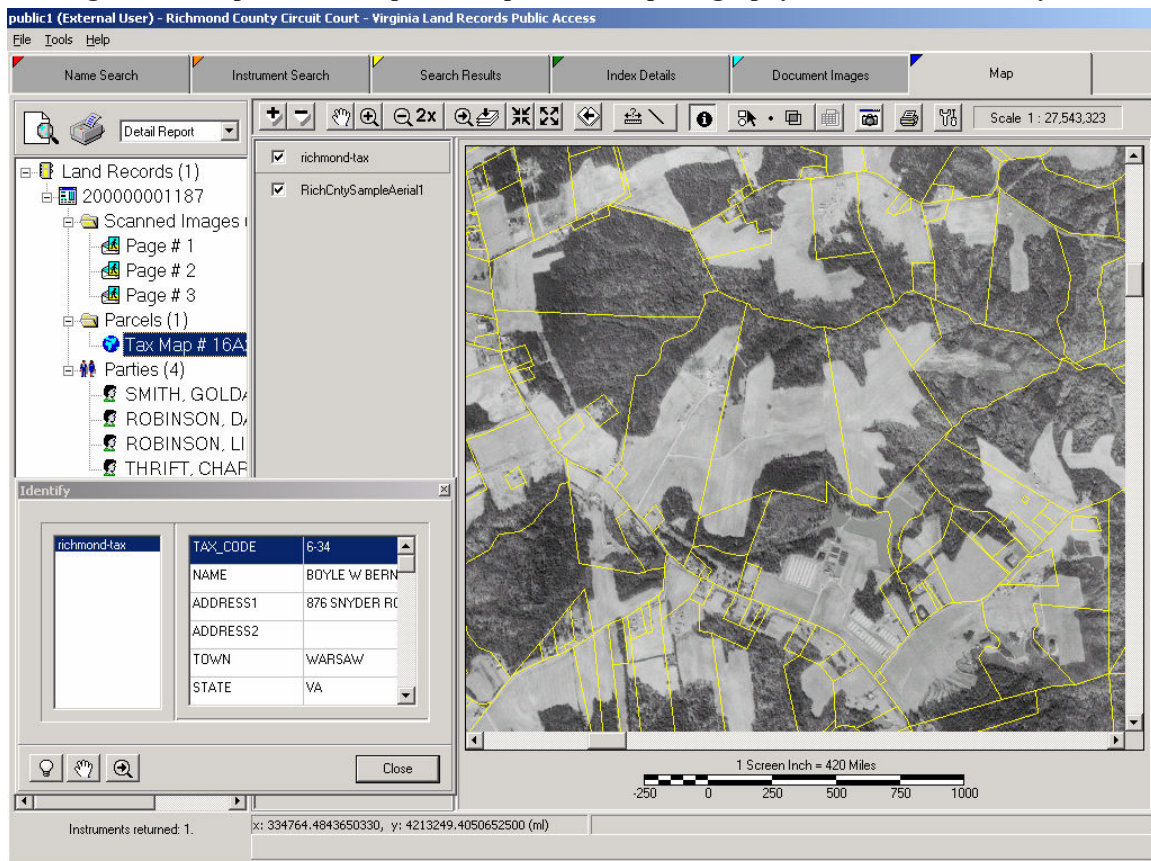
Product / Service / Function

Spatial Data - Minimum Requirements – Optional Requirements

Land record documents, such as deeds and plats, reference one or more land parcels which in many parts of Virginia are assigned a tax map number or other identification number that does not have a direct geographic location associated with it, such as map coordinates or street address. For example, Richmond County uses a parcel number that is a combination of tax map sheet numbers, double and single circle numbers, and parcel numbers and might look something like this "16A2(4)". This approach to using a non-spatial parcel reference is common in Virginia, and is the minimum requirement for referencing the location of a parcel. Unfortunately, a direct geographic reference to a parcel's location is considered an option in land records management systems today.

The Virginia Land Records Management Task Force Report recommends all local governments take appropriate action to define a common parcel identification numbering (PIN) scheme and requires the use of a parcel's PIN on all land record documents and as appropriate in manual and automated systems. The defined PIN scheme should provide unique parcel identification numbers for all parcels within the local government jurisdiction. For localities that have not developed a unique parcel identification numbering scheme, the Task Force recommends the use of the parcel centroid scheme using the Virginia State Plane Coordinate System/1983 (SPCS/83). This scheme uses the parcel's coordinates referenced to the SPCS/83 to calculate the center of the parcel to create a unique parcel identification number.

Figure 2. Computerized tax parcel map and aerial photography for Richmond County, VA



Furthermore, some jurisdictions in Virginia require that geographic points derived from traditional or GPS-based survey methods be used to control plats being recorded, so that the legal, geometric definition of a parcel can be correctly placed on the surface of the earth. These geographic control points may be in units of latitude – longitude degrees or Virginia State Plane Coordinates. A variety of approaches, from rubber sheeting to Coordinate Geometry (COGO) are used to update the tax parcel maps from land record documents.

Use of an optional PIN extends the value of land records information by allowing a locality to better link geographic and address-based information with land records. For example, with a link between a land record and the parcel(s) it references, it is possible to display a map of the parcels referenced by a land records document or find land record documents associated with a parcel selected on a map. More advanced searches are also possible. For example, one could locate all properties owned by John Smith and generate a list of owners for parcels surrounding those owned by Mr. Smith. One can also associate land records with building permits, delinquent taxes, voting districts, school districts, zoning classification, or by any other geopolitical boundary.

Attribute Data – Minimum Requirements – Optional Requirements

The Task Force, through the adoption of the Strategic Plan for Modernizing Land Records in the Commonwealth, identified several objectives that relate to the content and format of land records including: consistent indexing of land record instruments recorded in Circuit Court Clerks' offices, accessing and using automated index information, integration of all land records, and needed improvements in land records to support the development of local government geographic information systems.

Figure 3. Computerized index (attribution) for land record documents

The screenshot displays the 'Commonwealth of Virginia Land Records Public Access' web application. The interface includes a top navigation bar with tabs for Name Search, Instrument Search, Search Results, Index Details, Document Images, and Map. A left sidebar shows a tree view of 'Land Records (1)' with sub-items for '20000001187', 'Scanned Images (3)', 'Parcels (1)', and 'Parties (4)'. The main content area is titled 'Detail Report' and contains the following information:

Instrument Control # 2000 00001187 **Book #** 199 **Page #** 058

Instrument Type DBS-PL **Cover Sheet Date** 11/29/2000 **Recording Date/Time** 11/29/2000 2:20 PM

City ☐ **County** ☒ RICHMOND COU **Number of Parcels** 1 **Number of Pages** 3

Grantors / Grantees

Type	Last Name	First Name	Middle Name	Suffix	Corporation
R	SMITH	GOLDA	I		No
E	ROBINSON	DANIEL	ADAM		No
E	ROBINSON	LINDA	SUSAN		No
R	THRIFT	CHARLES	GREGORY	ATTY IN F	No

Parcels

Property Description1	Property Description2	Tax Map #	PIN	Prior Bc
LOT NO. 4, TOWN OF WARSAW, MAP	RICHMOND COUNTY, VIRGINIA	16A2 (4) 14, 15	16A2 (4) 14, 15	67

Grantee Address

Name DANIEL ADAM ROBINSON & LINDA SUSAN ROBINSON

Address 1 13721 JEFF DAVIS HIGHWAY, #103 **Address 2**

City WOODBRIDGE **State** VA **Zip** 22191

Consideration \$60,000.00 **Assumption Balance** \$0.00 **Existing Debt** \$0.00

Instrument Prepared By MERVIN C. WITHERS

Recording Paid For By SMITH, MURPHY & TALIAFERRO

Return Recording To

Name SMITH, MURPHY & TALIAFERRO

Address 1 P. O. BOX 277 **Address 2**

City WARSAW **State** VA **Zip** 22572

Customer Case ID

Ctrl-P Print Ctrl-W Print Preview

Instruments returned: 1.

The Final Report of the Virginia Land Records Management Task Force recommends the use of a Standard Land Records Cover Sheet to benefit Circuit Court Clerk offices and the land record user community. This report, dated January 1, 1998, can be found on the Web at: http://www.dtp.state.va.us/LRMTF/docs/lrmtf_final_report.pdf. In partnership with the Virginia Land Records Management Task Force and the Virginia Supreme Court, ILS developed the software that creates the official Land Records Cover Sheet for Virginia. This software, known as the *Cover Sheet Agent*, is available in four options – two are Web-based applications and two are standalone applications for computer desktop (http://www.landsystems.com/Landbased_Document_Management/CSA.htm).

Figure 4. Example of a land records cover sheet showing index (attribute) information

Instrument Control Number

Commonwealth of Virginia
Land Record Instruments
Cover Sheet - Form A

TAX

CORP

EXEMPT

[ILS VLR Cover Sheet Agent 1.0.59]

Date of Instrument: [3/15/00]

Instrument Type: [DOT]

Number of Parcels [4]

Number of Pages [5]

City ☐ **County** ☒ [City Of Norton] (Box for Deed Stamp Only)

First and Second Grantors			
Last Name	First Name	Middle Name or Initial	Suffix
[Grantor A]	[Grantor A]	[]	[]
[Grantor B]	[Grantor B]	[]	[]

First and Second Grantees			
Last Name	First Name	Middle Name or Initial	Suffix
[Grantee A]	[Grantee A]	[]	[]
[Grantee B]	[Grantee B]	[]	[]

Grantee Address (Name) [Jane Doe]

(Address 1) [999 Main St.]

(Address 2) []

(City, State, Zip) [Norton] [VA] [23456]

Consideration [10,000.00] **Existing Debt** [10,000.00] **Assumption Balance** [5,000.00]

Prior Instr. Recorded at: City ☐ County ☐ [] **Percent. in this Juris.** [100]

Book [] **Page** [] **Instr. No** []

Parcel Identification No (PIN) [98765]

Tax Map Num. (If different than PIN) [1-A]

Short Property Description [Whiteacre parcel 1 0.25 acres]

Current Property Address (Address 1) []

(Address 2) []

(City, State, Zip) [] [] []

Instrument Prepared by [B. Klose]

Recording Paid for by [ILS, Inc.]

Return Recording to (Name) [Brennan Klose]

(Address 1) [International Land Systems, Inc.]

(Address 2) [9525 Georgia Ave #205]

(City, State, Zip) [Silver Spring] [MD] [20910]

Customer Case ID [Case #1234] [Log #5678] [Billing Code 890]

Cover Sheet Page # 1 of 3

Section 17.1-227.1 of the Code of Virginia permits Circuit Court Clerks to require a coversheet for deeds and other instruments for purposes related to indexing accuracy, recording efficiency, and timely public access. The coversheet is designed so that indexing information entered on the coversheet form is translated into a 2-D barcode. The coversheet and its 2-D barcode are then attached as the first page of a document to be recorded and the indexing information is automatically read when scanned into the system. There is no fee associated with recording the coversheet. There is, however, a page charge for the coversheet when making copies of a recorded document, because recordation makes the coversheet an official part of the document.

The use of a standardized cover sheet provides several key enhancements for automating land records management that benefit the Circuit Court Clerks office and the users of these records. The cover sheet:

- Defines and enforces indexing standards.
- Builds a consistent, comprehensive land records index.
- Promotes accurate and efficient access locally and remotely.
- Provides a more efficient recording process.
- Reduces keying errors.
- Allows timely access to recorded documents.

The following list summarizes the minimum attribution, or index data, collected and recorded for land record documents in Virginia:

1. Instrument Number
2. Deed Book & Page
3. Type of Document (e.g. Deed of trust)
4. Date of Instrument
5. Recording Date
6. Number of Parcels
7. Short Description of Parcel(s)
8. Parcel(s) ID
9. Number of Pages
10. Recording Jurisdiction
11. Consideration
12. Grantor(s) Name(s)
13. Grantee(s) Name(s)
14. Grantee Address
15. Existing Debt
16. Assumption Balance
17. Parcel Identification Number (PIN)
18. Tax Map Number

The following list summarizes the optional attribution, or index data, collected and recorded for land record documents in Virginia:

1. Name of Person/Organization Preparing/Recording Document
2. Person/Organization Paying for Recording
3. Prior Instrument Recording Information (instrument number, deed book & page number, jurisdiction)
4. Return Address for Original Document
5. Short Property Description
6. Current Property Address
7. Customer Case Identification Information

Data Acquisition Options (integrated with VBMP digital orthos)

The most common database link that can be established between land records documents and the parcel(s) they reference is through the Parcel ID number (PIN, GPIN, etc.) and/or tax map number(s). Due to this direct attribution link between the land record documents and parcel maps, it is possible to search the text attributes of a land record index to locate a parcel or select a parcel from a digital map and display the land records associated with that parcel.

Currently, there are a number of ways in which parcels can be represented and geographically referenced in land records management systems. From the most basic to the most complete, these approaches include:

1. A simple text reference to the tax/parcel map sheet the parcel is located on
2. A point representing the geographic location of a parcel
3. A line defining the perimeter and geometry of a parcel
4. An attributed polygon defining the perimeter and geometry of a parcel

Many localities in Virginia describe the location of parcels in their land records management systems using only the first approach, which does not allow system users to display the precise geographic position a parcel. In most cases, users of land records management systems are referred only to a paper tax map book. At best, most systems display scanned tax map pages, and users are presented with an image of the tax map on which the referenced parcel resides.

The most advanced land records management systems in use in Virginia have the ability to geographically reference and display the location of parcels using the more advanced geometric and geographic approaches listed above. Although these land records management systems may be capable of showing the precise geometry and geographic location of parcel, the lack of maintained, digital parcel map layers often prevents system users of taking advantage of this capability.

Data Conflation Options (integrated with VBMP digital orthos)

The Task Force recommends that all local governments consider requiring references to the State Plane Coordinate System/1983 on plats and site plans as soon as possible. When required by a local government, this action will begin improving the quality of their land records and prepare them for future conversion to an accurate parcel base geographic information system.

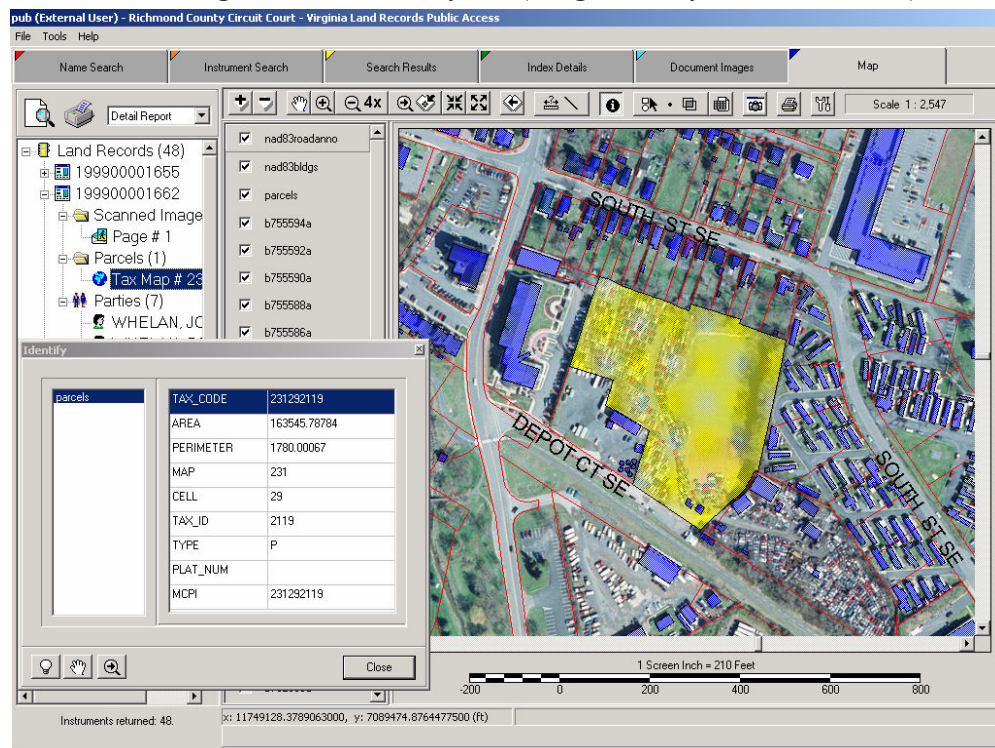
The Task Force also recommends that local governments that have local geodetic control networks with an insufficient number of monuments, consider taking action to require the use of GPS technology and the Virginia HARN to develop accurate information for referencing the State Plane Coordinate System/1983 on plats and site plans.

The production of the new statewide orthoimagery for Virginia presents an opportunity for many Virginia jurisdictions to overcome the lack of local geographic and survey control by using the inherent geographic control of the orthos. Using the orthos, localities can create, or improve the accuracy of, digital parcel map information for display in their land records management systems. The new orthoimages can be used in a number of ways to improve the quality of the parcel map information presented to their public and commercial users, including:

1. Geographic positioning of scanned (raster image) or digitized (vectors) versions of tax maps using control points observed on the VBMP digital orthos to transform or “rubber sheet” the map information to the correct geographic position as defined by the orthos.
2. Use of commercially-available street address data to geocode parcel addresses for display of the geographic location of parcels referenced in the land records management system as points on top of the orthos.

The Figure below is one illustration of the value of bringing together color orthos, digital tax parcel maps, annotated and addressed street centerlines, building locations, and tabular property assessment information.

Figure 5. Integration of land records and property information with a color orthoimage for the City of Leesburg in Loudoun County, VA (Image courtesy of VARGIS, LLC)



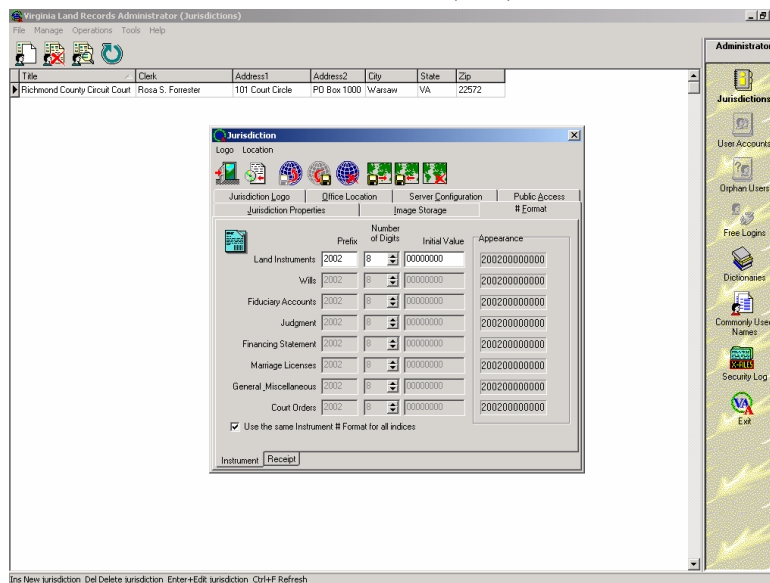
Graphical User Interface (GUI) / programming options

At present there are a variety of commercial off-the-shelf GIS applications and software tools that will display land records index data, scanned documents, and digital tax map information. Below is an alphabetical listing of current land records management system vendors in Virginia:

- AmCad
- Business Information Systems (BIS)
- Cott Systems
- Eagle Computer Systems
- International Land Systems (ILS)
- Logan Systems
- PEC
- Reams Computer Corporation
- Supreme Court

The software available from these vendors allow GUI personalization and configuration to varying degrees, but does not offer the end user significant ability to customize or integrate their solution with other information system without programming involvement by the vendor. In part, this is due to the document index standards and accounting regulations that must be adhered to. Ideally, the GUI should seamlessly integrate and facilitate the search and display of both land records index data, scanned pages of those documents, and parcel GIS information in the same software application in order to maximize the value of the new VBMP orthos for land records management.

Figure 6. Land records management access screen for personalizing and configuring the Graphical User Interface (GUI)



Some systems simplify data entry by presenting users with a pre-defined pull-down or pick list that contains the list of acceptable values, such as the official list of Circuit Court Clerk jurisdictions in Virginia. In addition, a variety of rules-based and standards-enforced workflows have been implemented. At least one system in use in Virginia today actually enforces the indexing standards and data formats recommended by the Task Force, regardless of how a user enters the information. For example, grantor and grantee names may be a person or an organization. If a “corporate” name is selected, then a user may enter letters and numbers to name the grantor/grantee (e.g. 3COM), but if a “personal” name is selected, then a user may not enter numbers. In addition, the indexing standards require that grantor/grantee names be entered as capital letters, and even if a user types in lower case letters, the system automatically converts them to capitals.

Internet Functionality and Options

Remote access to land records over the Internet was one of the four (4) major goals of The Land Records Management Task Force laid out in their final reports. The process of modernizing land records management in Virginia is very closely tied to this goal, because many of the objectives are needed to support and promote Internet-based access to land records information. Specifically, the task force report addresses standards for document indexing, imaging, databasing, and communication that lay the groundwork for creating and maintaining remote electronic access to a seamless, statewide, land records database. Circuit Courts around Virginia are modernizing their land records management practices and technology as progress toward this ultimate goal.

Figure 7. Web interface to Virginia Land Records™ index and scanned documents online

The screenshot displays the Virginia Land Records web interface within a Microsoft Internet Explorer browser window. The address bar shows the URL: http://sequia.landrecords.com/vlwebpa2/result.asp?i_id=4697&t=2&ind_t=0&ln=SMITH%2DJONES&mn=ALICE&mn=M#. The main content area is divided into two columns. The left column displays a scanned document titled "000409" and "This Deed of Trust prepared by SHORE BANK". The document includes the following text:

RECORDATION REQUESTED BY:
Shore Bank
Onley Branch
26253 Lankford Highway
P O Box 920
Onley, VA 23418

WHEN RECORDED MAIL TO:
Shore Bank
Onley Branch
26253 Lankford Highway
P O Box 920
Onley, VA 23418

SEND TAX NOTICES TO:
Alan M. SMITH-JONES
Cleveland R. JONES
P O Box 920
PAINTER, VA 23402

Tax Map Reference Note: PART OF 150-A-38 & 150-B-9
Parcel ID Number: PART OF 150-A-38 & 150-B-9 FOR RECORDEE'S USE ONLY

000409

This Deed of Trust prepared by SHORE BANK

Shore Bank

DEED OF TRUST

THIS IS A CREDIT LINE DEED OF TRUST

Maximum aggregate amount of principal to be secured hereby at any one time: \$132,000.00

Name and address of Noteholder secured hereby:

Shore Bank
Onley Branch
26253 Lankford Highway
P O Box 920

10 pages. Current: 1.

Previous instrument

Next instrument

Close window

The right column displays the "Land Records™ Virginia" logo and search options: [Instrument Field] [Search by Name] [Search by Parcel]. Below this is the "Document Details" section with the following information:

Year	2001	Page Number	1852	Images	10 image(s)
Recording Date	Jan 29 2001 9:53AM				

Below the document details is the "Parties" section with a table listing the parties:

File Name	First Name	Suffix	Corporation
	ALICE		No
	CLEVELAND		No
	HENRY	JR TR	No
	W	III TR	No

Below the parties section is the "Parcels" section with a table listing the parcels:

Percentage	Prev Book	Prev Page	Prev Instrument #
100			

Below the parcels section is the "Additional Details" section.

The bottom of the browser window shows the taskbar with the Start button and several open applications: Inbox - Outlook..., Loudoun LRM..., Microsoft Excel..., VLR web Publ..., Instrument ... The system clock shows 9:19 AM.

At present, several Virginia localities are providing remote access to their land records information over the Internet. Some of these localities provide access to land records index (text) information only, while others also provide access to the scanned documents themselves, usually for a fee. Only in a few jurisdictions is it possible to access land records indices, images, tax parcel maps, and other (e.g. assessment) information on the Internet. Clearly, the technology to provide combined access to land records and GIS data is available today, and more Virginia localities will be moving in this direction in the future. The availability of the VBMP orthos for all of Virginia provides a common base map for the display of parcels referenced by land record documents over the Web.

Minimum Technical Requirements – Optimum technical requirements

Land records management systems are designed for a wide range of users with a minimum understanding of computers. These systems are used by the staff of 121 Circuit Court Clerk's Offices in Virginia to record and manage millions of documents each year. Commercial title search companies and genealogists are the primary users of the records in these systems and have a wide range of technical and professional backgrounds.

Land record management systems are designed so that most users with some experience using general office software or a web browser can learn how to use the system in a matter of hours. Some land record management systems are designed to follow and track the user's progress through the system's workflow for document recording, indexing, scanning, and searching. Most data input and search screens are presented as single screen that prompt users for information or an action that are accomplished by pointing at a field on a form, typing in the requested information, and executing actions by clicking on buttons or by using pre-defined function keys.

Land record management systems are designed to run on the most common computer platforms in order to accommodate the average user. The minimum technical configuration of a computer system today is as follows:

- Personal Computers running Windows 95, 98, NT, 2000
- 64 Mb RAM
- Enough computer Disk Space to accommodate record data volume
- Standard 15" or 17" monitor
- Land Records Management Software

The optimum technical configuration for operating a land records management system, particularly in jurisdictions that handle a larger volume of land records, are as follows:

- A client server network with two or more servers for balancing the workload, assuring system availability, and data redundancy.
- Networking and communication infrastructure.
- Software utilities to manage, protect, and backup the system.
- Separate data storage using RAID technology (up to Terabytes).
- Latest Personal Computers with dual processors.

-
- Large (19” or 21”) flat panel monitors.
 - Internet access for serving and/or searching land records.

Administrative/Management Requirements

Most land records management system vendors provide a turnkey solution that includes all of the necessary system equipment, software, and services for installation, training and ongoing support. On-going support generally covers maintenance of all system hardware and software components, so that Clerks do not have to worry about servicing the system themselves. Larger jurisdictions that have their own Information Technology or Computer Services Department, may also provide technical support to the Clerks. For example, rural counties like Amelia and Powhatan rely extensively on vendor provided system administration and technical support, while the most urban counties in Virginia, like Loudoun, Fairfax, Prince William, Henrico and Spotsylvania have information technology service departments that provide varying degrees of administrative and technical assistance. Where counties provide support, it is generally related to the computer hardware and network communications infrastructure.

Land records management systems also include administrator capabilities for the Clerk’s office to manage the system. The system administrator in the Clerk’s office may use administrator privileges to do a number of things to include:

- Establish or change users accounts, passwords, and privileges.
- Edit the system’s data dictionary that defines acceptable values for data fields.
- View the security or transaction log to determine who took what actions on a document, and when.
- Generate and customize financial and workload reports.

System training is often organized into topics related to office workflow, and staff are often trained according to their duties. Senior staff generally receive training on all aspects of the system, while junior and/or specialized staff only receive training on a few topics. Here is a typical list of training courses and durations for a land records management system:

1. Basics (3-5 days)
 - a. Records Intake (cashiering & receipting)
 - b. Indexing
 - c. Scanning
 - d. Document Searches
 - e. Printing
2. Advanced (1-2 days)
 - a. Data Quality Control
 - b. Records Administration
 - c. Report Generation
3. Public Access (1 day)
 - a. Onsite and Remote Access

- b. Document Searches
- c. Report Generation
- d. Printing
- 4. System Administration (1-2 days)
 - a. System and Data Security
 - b. Computer Management
 - c. Network Management

The Clerks, or often their Chief Deputy, administer the system and system users. They may track daily, monthly and annual recordings by document type, and manage the office accounting using system capabilities. Depending on the size of the office staff and workload, system administration may only require an hour per day, or it may be a full time job.

Figure 8. Sample report that can be automatically generated using a land records management system.

Virginia Land Records Report

Commonwealth of Virginia

Richmond County Circuit Court

Search Conditions

Indexes Searched: Land Records

Index Data available:

Land Records: From 12/23/1999 10:20:00 AM To 1/25/2001 9:40:00 AM

Search Criteria:

Last Name 1: 'SMITH'

First Name 1: 'GOLDA'

Middle Name 1: 'I'

Land Records Search Results (1 party records)

Party	Suffix	Party Type	Instrument Type	Book	Page	Recording Date	Property Description	Instrument #
SMITH, GOLDA I		Grantor	DEED BARGAIN AND SALE W/ PLAT	199	058	11/29/2000 2:20:00 PM	LOT NO. 4, TOWN OF WARSAW, MARSHALL MAGISTERIAL DISTRICT 0.5119 ACRE RICHMOND COUNTY, VIRGINIA	200000001187

1 party records
Printed by: pat

4/30/2002 5:52:46 PM

Page 1 of 1 Esc Close Preview Ctrl-P Print

Cost – Cost/Benefit

Circuit Court Clerks in Virginia are responsible for recording and maintaining land records and other documents for the Commonwealth. As part of their duty, all Circuit Court jurisdictions now have some type of computerized system for recording and indexing land records. According to the 2002 Land Records Management Progress

Report (Virginia State Compensation Board), approximately 84 of the 121 Courts now have document scanning capabilities, and 24 have remote access to their record indexes (text only), with only 12 offering remote access to document images as well. Few courts have integrated their system to include information from other departments such as tax assessment (13 courts) or GIS information (3 courts). According to the 2002 Land Records Management Progress Report, the majority (69 courts) have made extending their electronic record their top priority for spending Technology Trust Fund money. Most title searcher need at least 30 years, and preferably 60 years, of records available before searching land records online is viable – something that title searchers are willing to pay a subscription fee for.

So, while each jurisdiction currently has some type of system in place, there is ample room for further enhancing and modernizing many of them. The potential cost of a modern land records management system for jurisdictions in Virginia varies directly with the current state of technology in the Clerk's Office, the number of Clerk's staff in the office, and the workload they process.

Some Clerks have elected to upgrade their system with their current vendor, or to completely replace their land records management system with a more modern one from another vendor. A complete records management system, including five new computers on a local network with a nominal amount of data, with all necessary software, system installation, training, and support services can be purchased directly for a minimum of around \$40,000. New land record management systems for jurisdictions with the largest workloads in Virginia may cost in excess of \$1,000,000. The typical components and pricing of new land records management system hardware, software and services are shown in the table below:

System Component	Typical Quantity
<i>System Hardware & Peripherals</i>	
Computer Servers for staff production and hosting public (with MS Windows operating system, database software, system utilities)	1-2
Image Mass Storage (RAID)	0-1
Client workstations for staff production and public access (with system software and utilities)	5-30
Network Equipment for System (hubs, switches, cabling)	Various
Document Scanners (letter & legal size, 11" x 17")	1-3
Plat Scanners (up to E-size documents)	0-1
Laser Printers (letter & legal size, 11" x 17")	2-10
Large Format Plat Plotters (up to E-size documents)	0-1
<i>Typical Price for System Hardware:</i>	\$20,000-\$300,000

<i>Land Records Management Application Software</i>	
Server and Client applications for recording, indexing, scanning, verification and public access	6-32
<i>Typical Price for Application Software:</i>	\$15,000-\$150,000
<i>System Implementation Services</i>	
System Installation, Integration & Testing (days)	3-30
System Training (days)	5-15
<i>Typical Price for Services:</i>	\$5,000-\$100,000
Ongoing System Support (months)	\$300-\$1,500 per month

The following table summarizes the primary objectives of the land records management automation effort in Virginia. These objectives generally relate to the ability of Circuit Court Clerks to more efficiently handle the increasing office workload and to provide better service to citizens of the Commonwealth.

Figure 9. Summary of the benefits derived from using a modernized land records management system

Achieving Virginia's Land Records Management Objectives	
Required Outcome	The Solution
<ul style="list-style-type: none"> Handle the increasing workload 	<ul style="list-style-type: none"> Workflow streamlining and process automation
<ul style="list-style-type: none"> Improve the level of customer service 	<ul style="list-style-type: none"> Public access stations combine powerful index searching and document viewing Integrate recording, receipting, and cashiering functions into a single workstation for faster processing of recordings at the front counter
<ul style="list-style-type: none"> Facilitate easy access to all land records by the general public, various customer groups, Land records staff and County employees from other departments 	<ul style="list-style-type: none"> Integration of land records with other county information systems to provide near real-time access to land records and other information it cross-references through an ODBC interface.
<ul style="list-style-type: none"> Reduce the usage of, and dependency on, paper records 	<ul style="list-style-type: none"> Scanning of all documents for on-screen viewing Conversion and loading of current electronic indexes to facilitate searching of documents
<ul style="list-style-type: none"> Provide timely access to information 	<ul style="list-style-type: none"> Upon recordation and receipting of new land records, the system instantaneously provides the electronic equivalent of a paper "Daily Scratcher" for showing recordation prior to complete document indexing & verification Integration of land records system

	with other county information systems allows for near real-time access to land records information
<ul style="list-style-type: none"> ▪ Rapidly sort data and ensure timely and effective search capabilities 	<ul style="list-style-type: none"> ▪ Powerful search functionality that allows wildcard and combined keyword searches for rapid filtering of database ▪ The index database on public access and web servers are highly optimized for fast search and retrieval
<ul style="list-style-type: none"> ▪ Provide <i>ad hoc</i> report generation capabilities 	<ul style="list-style-type: none"> ▪ State-of-the-art relational database technology and integrated Crystal Reports software allows for custom, on-demand reports

Regardless of the size of the workload a jurisdiction may process, a modern land records management system has been shown to provide great benefits to the offices that utilize all or most of the automation capabilities that have been developed, from the land records cover sheet with the 2-D barcode, to automated batch scanning, to streamlined workflows, to on-screen verification. According to a recent survey performed by the Virginia Supreme Court, Circuit Court Clerk's Offices are understaffed by an average of 20%. Since the recordation and management of a growing number of land record documents each year is not a luxury, but a requirement, for Circuit Court Clerks, the best way to keep up with the growing workload without additional staff is to streamline and automate their office.

In Clerk's offices where automation enhancements have been implemented, staff have reported a significant time savings in performing their daily duties. For example, in Page County Virginia (Luray), The Honorable Ron Wilson has reported that his staff have been able to complete their daily duties in approximately 25% less time since they have implemented their new land records management system over two years ago. A "time savings" of this magnitude quickly justifies the cost of system modernization. In some cases, such as Spotsylvania County, a modern land records management system means the difference between keeping up with the increasing workload, or falling behind.

Many Clerks have also turned to the Web as a way of generating some additional revenue to help defray the cost of modernizing and automating their offices. At present, only a few Circuit Court Clerk jurisdictions offer access to their land record indexes and scanned documents to commercial and private users for a nominal subscription charge. As more Clerks automate their offices and build an extensive historical digital record, there will be an increasing demand for remote access to these digital archives on the Web, and increasing opportunities to provide integrated access to those land record documents and GIS parcel data for added value. The VBMP orthos would provide an excellent image backdrop for the display of tax parcel maps online.

Standards / Guidelines Summary

The Virginia Land Records Management Task Force, chaired by Jack Kennedy Jr. (Circuit Court Clerk of Wise County & City of Norton) defined land records management standards and guidelines for Virginia and the many benefits of modernizing the recording and dissemination the process in their Final Report dated January 1, 1998 (http://www.dtp.state.va.us/LRMTF/docs/lrmtf_final_report.pdf). The key standards and guidelines addressed in that document include:

1. Indexing (or attribution) of land record documents.
2. Use of a standard land record cover sheet to accomplish that indexing.
3. Document scanning and image management.
4. Creation and use of a unique parcel ID number (with geographic context).
5. Remote access to land record documents.

In addition, the Task Force recommends that all local governments consider requiring references to the State Plane Coordinate System/1983 on plats and site plans as soon as possible. When required by a local government, this action will begin improving the quality of their land records and prepare them for future conversion to an accurate parcel base geographic information system.

Startup Procedures/Steps

As discussed earlier, all Circuit Court Clerk offices in Virginia are required to record and manage land record documents for their jurisdictions. Currently all have some type of computerized system in place to accomplish their recording and reporting duties. There is significant opportunity for most Circuit Court Clerk offices to further automate their offices by enhancing or adding technology and workflow tools to their office. Such upgrades may take only a few days to implement, others may take months, depending on the nature of the replacement or upgrade. Clerks that are considering complete replacement of their current system can begin the process by:

- Visiting their fellow Circuit Court Clerks to see their system and hear what they like and don't like about it
- Requesting information from vendors about their system
- Requesting a demonstration of available systems from vendors

These few basic steps are all that is required for Clerks to gather the information they need to either make a purchase decision from a vendor, or to generate a Request for Proposal for vendors to respond to. Once a Clerk selects a vendor, and the contract has been negotiated and finalized, there are a number of major phases and steps associated with system implementation and a new system becoming fully operational. These major steps include:

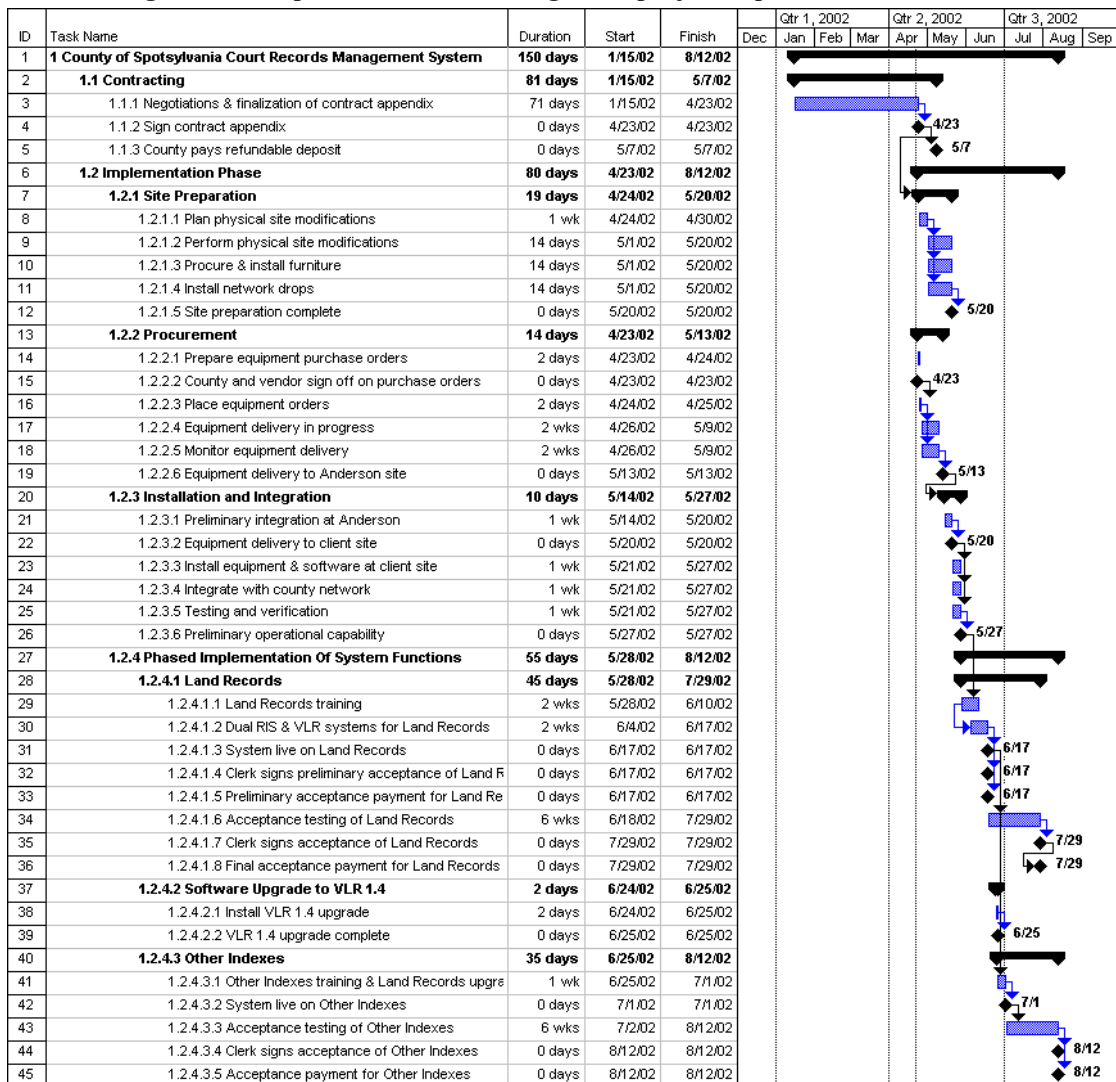
- Requirements and System Design Review
- System Equipment Procurement

-
- Software Configuration Customization
 - Site Preparation
 - System Implementation
 - System Integration
 - System Testing & Certification
 - Training
 - Backfile Conversion

Estimated time line and/or implementation (stand alone) schedule

Circuit Court Clerks in Virginia wishing to modernize their system and take advantage of VBMP orthos have the options of either upgrading their current system or replacing it. If a Clerk elects to upgrade the current system, assuming an upgrade is immediately available, the upgrade could be implemented in a matter of a few days to a couple of weeks. If a Clerk elects to replace their current system, they could expect their new vendor to take at least 8-10 weeks to purchase, deliver, install, test, and train their staff on the new system. Of course, differences in local procurement practices may greatly extend the timeframe for implementing a new system. Conversion and loading of their legacy data (called backfile conversion), along with loading of the VBMP orthos, may take most vendors many months to accomplish beyond the initial implementation of the new system. An example project implementation schedule for Spotsylvania County is shown in the following figure.

Figure 10. Sample land records management project implementation schedule



Best Practice Examples in Virginia

Wise County, Spotsylvania County and Page County are three Circuit Court Clerk's offices in Virginia that are leading the way in implementing technology to better meet the needs of the court staff, as well as to provide better service to business, the public, and county government. Please feel free to contact these courts for more information.

Wise County Circuit Court

The Wise Circuit Court and Clerk's Office has a vision of using information technologies to enable the professional and citizen users of its services low cost 24 x 7 interaction with the Court and the Clerk's Office over the next year on the Web (<http://www.courtbar.org/>). The Clerk of Court has engaged strategic partners to develop technology applications including electronic filing of land records and civil litigation,

web-based maps of the area with numerous layers of data, electronic filing of deposition and trial transcripts, small court jury management software, and digital audio-visual applications. Both the government and private sector may adopt change management to reinvent the workflow process to cut the cost of storage and travel while speeding the business process. This would mean a savings to taxpayers and the private sector in the years ahead.

You may contact the Wise County Circuit Court Clerk at:

The Honorable Jack Kennedy, Jr.
Circuit Court Clerk
P.O. Box 1248
206 E. Main Street, Court House
Wise, Virginia 24293-1248
Telephone: 276.328.6111
Fax: 276.328.0039
E-Mail: jkennedy@naxs.com

Spotsylvania County Circuit Court

The Spotsylvania Circuit Court Clerk's office has implemented a new system that best integrates the multiple functions (Land Records, Civil, Criminal) of that office. The system utilizes a single Windows 2000 workstation for each staff member that is running all of the office software they need, including: land records management software, the Financial Management Software (FMS) and Case Management Software (CMS) from the Virginia Supreme Court, office software, court e-mail, and a Web browser. Once the State Supreme Court's Probate Software is available for Windows 2000, this software will be added to the court's network. This is the first known instance where a court has implemented a modernized land records management system with the software it needs to fulfill all of the other aspects of the office's duty. The objective is to eliminate the need for multiple computers on staff desks, and to increase the efficiency of the office.

You may contact the Spotsylvania County Circuit Court Clerk at:

The Honorable Paul Metzger
P. O. Box 96
9113 Courthouse Road
Spotsylvania, VA 22553-0096

Page County Circuit Court

The Page County Circuit Court Clerk's office is utilizing 2-D barcode technology to more efficiently index land records documents and process marriages licenses. All land record documents being filed in Page County must be accompanied by a 2-D barcoded cover sheet that contains all of that document's index information for automated ingest by a barcode reader upon filing in the Clerk's Office. The office also uses the barcode

reader to extract information it needs from the Bride and Grooms Virginia Driver's Licenses (with 2-D barcode) to automatically complete the multiple page marriage license application. After the marriage is performed, and the signed copies of the license are returned the Clerk's Office, the staff simply scans the signed, barcoded form into the system. Scanning that form actually accomplishes two steps at once, it creates an image of the document for public record and transfer to archival microfilm, and the scanned barcode is de-coded to automatically link the image of the marriage license application with the indexed information entered previously.

You may contact the Page County Circuit Court Clerk at:

The Honorable Ron Wilson
116 South Court Street, Suite A
Luray, VA 22835
540/743-4064, 6902
Fax: 540/743-2338

Glossary

Backfile Conversion – The process of digitizing land records documents and indexes from paper books and or microfilm so that they are searchable and displayable in a computerized system.

Coordinate Geometry (COGO) –The process of defining the geographic extent of a land parcel with a series of survey distances and bearings.

Geocoding – The process of assigning a geographic coordinate with an object, such as the street address of a land parcel. The process uses a common attribute in two or more data sets to link the desired attribute(s) with a coordinate.

GPIN – A Geographic Parcel Identification Number (GPIN) is a unique number used to define a parcel by its location on the surface of the earth. A GPIN may take many forms, but is often the map coordinate of a parcel centroid.

Parcel Centroid – The approximate geographic center of a parcel used to uniquely identify a parcels map location. Many GIS software applications will automatically calculate a parcel centroid using the mathematical average of the minimum and maximum latitude (northing) and longitude (easting) of the vertices defining a parcel.

RAID – Redundant Array of Independent Disks. A term used to describe the approach to storing computer data across multiple computer hard disks in a configuration such that multiple copies of the data exist on multiple disks, so that a failure of a single hard disk does not eliminate the availability of data elements on the system as a whole.